IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. 2310.101.US

In re the PATENT application of

Dan Keith McCoin

Serial No.: Not Yet Assigned

Filed: Herewith

For: Wind Energy Conversion System

Petition for Special Status

Mail Stop: PATENT APPLICATION
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant, through the undersigned attorney, hereby petitions to have the subject patent application granted special status for accelerated examination so that it may be examined out of turn and as soon as possible.

The basis for this petition is 37 C.F.R. §1.102(c) and MPEP §708.02(VII). Applicant, through the undersigned attorney, submits that the invention described and claimed in the subject application materially contributes to the development of energy resources. The invention of the subject application provides a wind energy conversion system for electrical power generation. The wind energy conversion system is of reduced mass, weight and cost, and enhances the viability of wind as a renewable energy source.

No petition fee is required under 37 C.F.R. §1.102(c).

Claims 1-29 are pending in the subject patent application and are directed to a

single invention.

Applicant states that a pre-examination search was conducted for the invention described in the subject patent application and that the search was conducted, at the instruction of Applicant's attorney, by a professional searcher utilizing the records available through the United States Patent and Trademark Office. The field of search was as follows: Class 290, subclasses 44 and 55 (including foreign art and literature) and Class 415, subclasses 2.1, 4.1, 4.2, 4.3, 4.4, 4.5, 60, 68, 905, 907, 908 and Digest 4.

Submitted herewith is an Information Disclosure Statement and PTO Form-1449 citing each reference uncovered during the search or otherwise known to Applicant and deemed to be related to the subject matter encompassed by the claims of the subject application. Copies of the references are also submitted herewith.

Applicant's Claimed Invention

Applicant's claimed invention is a wind energy conversion system of reduced mass, weight and cost and comprising a wind turbine and a tower supporting the wind turbine in an elevated position above the ground. The wind turbine comprises a stator, a blade assembly mounted for rotation about a vertical rotation axis in response to air flow through the wind turbine and a rotor carried by the blade assembly for rotation past the stator to produce an electrical output. The wind turbine may be an upper wind turbine in which the blade assembly rotates in a first direction about the vertical rotation axis, and the wind energy conversion system may further comprise a lower wind turbine disposed beneath the upper wind turbine and comprising a stator, a blade assembly mounted for rotation in a second direction, opposite the first direction, about the vertical rotation axis in response to air flow through the lower wind turbine, and a rotor carried by the blade assembly of the

lower wind turbine for rotation past the stator of the lower wind turbine to produce an electrical output. The wind energy conversion system includes a balancing mechanism for balancing the torques produced by the upper and lower wind turbines to avoid a net torque. The balancing mechanism may comprise a pitch adjustment mechanism for each wind turbine for adjusting the pitch angles of the blades of the blade assemblies. The balancing mechanism may comprise an air gap adjustment mechanism for each wind turbine for adjusting the size of an air gap between the stator and the rotor. The rotor for each wind turbine may comprise a plurality of permanent magnets carried by an outer rim of the blade assembly, and the stator for each wind turbine may comprises a plurality of stator coils. The air gap adjustment mechanism may comprise a track along which the stator is moved toward and away from the plane of the rotational path of movement of the rotor to respectively decrease and increase the size of the air gap between the stator and the rotor that comes into alignment with the stator as it is rotated in the rotational path of movement. The wind energy conversion system includes a hood disposed over the wind turbine and defining an intake air passage for supplying intake air to the wind turbine and an exhaust plenum disposed beneath the wind turbine defining an exhaust passage for exhausting air away from the wind turbine. The hood includes an intake opening facing lateral to the vertical rotation axis and a discharge opening for discharging the intake air toward the wind turbine. The exhaust plenum has an outlet opening facing away from the vertical rotation axis for exhausting the air from the exhaust plenum. The hood is rotatable about the vertical rotation axis to maintain the intake opening facing upwind, and the exhaust plenum is rotatable about the vertical rotation axis to maintain the outlet opening facing downwind.

Independent claim 1 and dependent claims 2-13 are directed to a wind energy

conversion system comprising upper and lower wind turbines, a tower supporting the upper and lower wind turbines in an elevated position above the ground and a balancing mechanism for balancing the torques produced by the upper and lower wind turbines to avoid a net torque.

Independent claim 14 and dependent claims 15-21 are directed to a wind turbine comprising a stator, a blade assembly mounted for rotation about a rotation axis in response to air flow through the wind turbine, and a rotor carried by the blade assembly for rotation past the stator to produce an electrical output, the blade assembly carrying the rotor for rotation in a rotational path of movement disposed in a plane, the rotor coming into alignment with the stator as the rotor is rotated in the rotational path of movement, the stator being spaced from the rotor aligned therewith by an air gap, and comprising an air gap adjustment mechanism including a track along which the stator is moved toward and away from the plane of the rotational path of movement to respectively decrease and increase the size of the air gap.

Independent claim 22 and dependent claims 23-29 are directed to a wind energy conversion system comprising a wind turbine including a stator, a blade assembly mounted for rotation about a vertical rotation axis in response to air flow through the wind turbine and a rotor carried by the blade assembly for rotation past the stator to produce an electrical output, a hood disposed over the wind turbine defining an intake air passage for supplying intake air to the wind turbine, the hood having an intake opening facing lateral to the vertical rotation axis for taking in intake air and a discharge opening for discharging the intake air toward the wind turbine, the hood being rotatable about the vertical rotation axis to maintain the intake opening facing upwind, an exhaust plenum disposed beneath

the wind turbine defining an exhaust passage for exhausting air away from the wind turbine, the exhaust plenum having an outlet opening facing away from the vertical rotation axis, the exhaust plenum being rotatable about the vertical rotation axis to maintain the outlet opening facing downwind, and a tower supporting the wind turbine in an elevated position above the ground.

Discussion of the References

As explained below, none of the references cited in the Information Disclosure Statement teaches or suggests a wind energy conversion system having the features recited in the claims.

U.S. Patent No. 25,269 to Livingston discloses a windmill having a wind wheel B mounted for rotation about a vertical axis and a cowl D which is maintained facing the wind for supplying intake air to the wind wheel B. The wind wheel B does not include a stator and rotor for producing an electrical output as is required for the wind turbines recited in the claims of the subject application. Livingston discloses only a single wind wheel B and fails to teach or suggest a balancing mechanism for balancing the torques produced by counter-rotating wind turbines as required by independent claim 1 and claims 2-13 depending therefrom. Since Livingston does not disclose the wind wheel B as having a rotor and stator, Livingston does not and cannot teach or suggest the feature of an air gap adjustment mechanism as recited in independent claim 14 and claims 15-21 depending therefrom. Livingston does not disclose an exhaust plenum disposed beneath the wind wheel B and having an outlet opening facing away from the vertical rotation axis and being rotatable about the vertical rotation axis to maintain the outlet opening facing downwind. Accordingly, Livingston does not teach or suggest the features required by independent

claim 2 and its dependent claims 23-29.

U.S. Patent No. 1,233,232 to Heyroth discloses a wind wheel 1 mounted for rotation about a horizontal rotation axis and carrying on its periphery 2 a plurality of inductors or metal shoes 3 which are rotated past a stator B. Heyroth is unrelated to the issue of torque produced by a wind turbine in which the blade assembly rotates about a vertical rotation axis. Accordingly, Heyroth does not and cannot teach or suggest a balancing mechanism for balancing the torques produced by counter-rotating wind turbines as required by independent claim 1 and its dependent claims 2-13. Heyroth also does not disclose any mechanism by which an air gap between the stator B and the inductors 3 may be adjusted, much less a track along which the stator is moved as required by independent claim 14 and its dependent claims 15-21. Independent claim 22 and its dependent claims 23-29 require a hood and an exhaust plenum, and neither of these features are disclosed or suggested by Heyroth.

U.S. Patent No. 1,352,960 to Heyroth discloses a wind wheel 3 rotatable about a horizontal rotation axis, a series of magnetic pieces or inductors 8 along the periphery of the wheel 3 and a stator 9 past which the inductors are rotated. Heyroth does not teach or suggest a balancing mechanism for balancing the torques produced by counter-rotating wind turbines as recited in claims 1-13 of the subject application, an air gap adjustment mechanism including a track along which the stator is moved as recited in claims 14-21 of the subject application, or a hood and exhaust plenum as recited in claims 22-29 of the subject application.

U.S. Patent No. 1,944,239 to Honnef discloses a wind wheel comprising independently movable coaxial wheels 1 and 2, the rims 3 and 4 of which are fitted

respectively with dynamo members 5 and 6 for the direct generation of electric current. The wheels 1 and 2 are driven in opposite directions about a horizontal rotation axis. Each wheel 1 and 2 does not produce an electrical output independently in that the wheels 1 and 2 cooperate via their dynamo members 5 and 6 to produce electric current. Honnef is unrelated to the issue of torque generated by counter-rotating wind turbines in which the blade assemblies rotate about a vertical rotation axis, and Honnef does not teach or suggest a balancing mechanism for balancing the torques produced by counter-rotating wind turbines as required by independent claim 1 and dependent claims 2-13. Honnef does not disclose or suggest the feature recited in independent claim 14 and dependent claims 15-21 of an air gap adjustment mechanism including a track along which the stator is moved, it being noted that Honnef does not disclose any mechanism whatsoever by which the air gap between the dynamo members 5 and 6 is adjustable. There are no teachings or suggestions whatsoever by Honnef of a hood or an exhaust plenum as required by claims 22-29.

U.S. Patent No. 2,563,279 to Rushing discloses a wind turbine including counter-rotating impellers C disposed within an impeller housing B for rotation about a horizontal rotation axis. The impeller housing is rotatable about a vertical axis via an electric motor. Rushing does not relate to the issue of torque generated by counter-rotating blade assemblies which rotate about a vertical rotation axis and does not disclose or suggest a balancing mechanism for balancing the torques produced by counter-rotating wind turbines as required by claims 1-13. The impellers disclosed by Rushing do not carry a rotor for rotation past a stator and, therefore, Rushing does not and cannot teach or suggest an air gap adjustment mechanism as recited in claims 14-21. Rushing also does not provide any

teachings related to a hood and an exhaust plenum for a wind turbine in which the blade assembly is mounted for rotation about a vertical rotation axis as required by claims 22-29. Rather, in Rushing, the impeller housing B is rotatable about a vertical axis whereas the impellers rotate about a horizontal rotation axis.

U.S. Patent No. 3,883,750 to Uzzell, Jr. discloses a fan 46 mounted for rotation about a horizontal axis within a chamber 12 that is mounted on a turntable 24 for rotation about a vertical axis. Uzzell, Jr. does not bear any relationship to balancing the torque produced by counter-rotating wind turbines in which the blade assemblies are mounted for rotation about a vertical rotation axis, and Uzzell, Jr. does not disclose or suggest a balancing mechanism as required by claims 1-13. Uzzell, Jr. does not disclose the fan 46 as carrying a rotor for rotation past a stator to produce an electrical output and does not and cannot teach or suggest an air gap adjustment mechanism as recited in claims 14-21. In Uzzell, Jr. the openings in chamber 12 are in line with the horizontal rotation axis for fan 46 and the chamber 12 is not rotatable about the rotation axis about which the fan 46 rotates. Uzzell, Jr. does not relate to supplying intake air to and exhausting intake air from a wind turbine in which the blade assembly is mounted for rotation about a vertical rotation axis and the features of a hood and an exhaust plenum as recited in claims 22-29 are not taught or suggested by Uzzell, Jr.

U.S. Patent No. 4,182,594 to Harper et al discloses wind wheels 52 and 54 mounted for rotation about a horizontal axis within a wind chamber 22. Rotors 74 carried by fan blades are rotated past stators 76. Harper et al does not teach or suggest a balancing mechanism for balancing the torques produced by wind turbines in which the blade assemblies counter-rotate about a vertical rotation axis, it being noted that Harper et al

does not even relate to an arrangement where blade assemblies counter-rotate about a vertical rotation axis. The features required by claims 1-13 are thusly not disclosed or suggested by Harper et al. Harper et al does not disclose any mechanism whatsoever by which an air gap between the rotors 74 and the stators 76 may be adjusted as is required for independent claim 14 and dependent claims 15-21. The wind chamber 22 disclosed by Harper et al does not have the characteristics of the hood and exhaust plenum recited in claims 22-29.

U.S. Patent No. 4,398,096 to Faurholz discloses a wind turbine 14 positioned within the inlet 20 of a turbine housing 22. A concentrator 10 directs intake air to the wind turbine and has an intake opening in line with the horizontal axis about which the wind turbine rotates. Air exits the turbine housing 22 via exhaust tubes 24 and 34. A second turbine 32 is positioned in the outlet of the exhaust tube 24. Faurholz is not related to an arrangement wherein is a blade assembly of a wind turbine carries a rotor for rotation past a stator to produce an electrical output much less counter-rotating blade assemblies where the blade assemblies rotate about a vertical rotation axis. Faurholz does not teach or suggest a balancing mechanism for balancing the torques produced by counter-rotation wind turbines in which the blade assemblies rotate about a vertical rotation axis such that Faurholz does not and cannot disclose the features recited in claims 1-13. Since Faurholz does not relate to a wind turbine where the blade assembly carries a rotor for rotation past a stator, Faurholz does not and cannot teach or suggest the air gap adjustment mechanism which is a requirement of claims 14-21. The concentrator 10 and exhaust tube 24 of Faurholz do not correspond to a hood and an exhaust plenum for a wind turbine that is mounted for rotation about a vertical rotation axis as characterized in claims 22-29. In

Faurholz, the intake opening to the concentrator 10 faces in the same direction as the horizontal rotation axis for the wind turbine 14 and does face lateral to the rotation axis. The outlet openings of the exhaust tube 24 do not face away from the horizontal rotation axis. Accordingly, the features recited in claims 22-29 are not taught or suggested by Faurholz.

U.S. Patent No. 4,720,640 to Anderson et al discloses a wind turbine 9 mounted for rotation about a horizontal rotation axis including a turbine ring 36 carrying rotor elements 100 for rotation past a stator 46. Anderson et al does not relate to balancing the torques produced by counter-rotating wind turbines wherein the blade assemblies rotate about a vertical rotation axis and fails to disclose any structure corresponding to a balancing mechanism as required by claims 1-13. There are also no teachings or suggestions whatsoever in Anderson et al of any mechanism by which an air gap between the rotor elements 100 and the stator 46 may be adjusted as characterized in claims 14-21. Anderson et al discloses various shrouds for the wind turbine, but none of the shrouds disclosed by Anderson et al corresponds to a hood and an exhaust plenum having the features recited in claims 22-29.

U.S. Patent No. 5,299,913 to Heidelberg discloses rotor blades 8 mounted for rotation about a horizontal rotation axis. Rotary motion of the rotor blades 8 is converted into an electrical output by rotation of supporting ring 44 about a vertical rotation axis causing movement of permanent magnets 48 past a stator 54. The issue of balancing torque produced by counter-rotating wind turbines is not address by Heidelberg, and Heidelberg fails to disclose a balancing mechanism as characterized in claims 1-13. Heidelberg refers to an air gap between the permanent magnets and the stator but does

not teach or suggest any structure by which the air gap may be adjusted as characterized by claims 14-21. Heidelberg does not disclose or suggest any structure corresponding to a hood and exhaust plenum as required by claims 22-29.

U.S. Patent No. 5,315,159 to Gribnau discloses a turbine rotor 1 mounted for rotation about a horizontal or nearly horizontal axis. The turbine rotor 1 may carry a rotor 6 for rotation past stators 5 (Fig. 1B). Gribnau does not relate to counter-rotating wind turbines and thusly does not disclose or suggest a balancing mechanism for balancing the torques produced by counter-rotating wind turbines as required by claims 1-13. Gribnau also does not disclose or suggest any mechanism by which an air gap between the rotor 6 and the stators 5 may be adjusted. Accordingly, Gribnau does not disclose any features related to claims 14-21. The features of a hood and exhaust plenum as recited in claims 22-29 are not disclosed or suggested by Gribnau in that no structure is disclosed by Gribnau corresponding to a hood or an exhaust plenum.

U.S. Patent No. 5,457,346 to Blumberg et al discloses a windmill 10 mounted for rotating about a horizontal axis and an accelerator 22 for directing intake air to the windmill 10. Blumberg et al does not disclose the blades 18 of the windmill as carrying a rotor for rotation past a stator and does not disclose or suggest a balancing mechanism as required by claims 1-13. Since Blumberg et al does not disclose a rotor carried by a blade assembly past a stator, there can be no teachings or suggestions whatsoever by Blumberg et al of a an air gap adjustment mechanism required by claims 14-21. The air intake opening for the accelerator 22 of Blumberg et al does not face lateral to the rotation axis of the blades 18 and is not rotatable about a vertical rotation axis. In addition, Blumberg et al does not disclose an exhaust plenum, and the features recited in claims 22-29 are not

found in Blumberg et al.

U.S. Patent No. 6,064,123 to Gislason discloses a multi-vaned rotor 14 mounted for rotation about a horizontal rotation axis and carrying a plurality of magnets 84 for rotation past a stator 16. Gislason discloses a single rotor 14 and does not reach the issue of balancing the torques produced by counter-rotating wind turbines wherein the blade assemblies rotate about a vertical rotation axis. Accordingly, the features recited in claims 1-13 are not disclosed or suggested by Gislason. Gislason discloses shims 77 disposed between the magnets 84 and the rim 76 but fails to teach or suggest an air gap adjustment mechanism including a track along which the stator is moved as characterized in claims 14-21. Gislason does not disclose any structure corresponding to a hood or an exhaust plenum as featured in claims 22-29.

U.S. Patent No. 6,278,197 B1 to Appa discloses counter-rotating rotor blades 36 and 40 mounted for rotation about a horizontal rotation axis. No mechanism is disclosed by Appa for balancing torques produced by the rotor blades, and Appa does not disclose the features of claims 1-13. In Appa, the rotor blades drive concentric shafts 26, 28, and an armature winding 46 is provided on the outer shaft 28 while a plurality of magnets 48 are mounted on the inner shaft 26. Appa does not disclose or suggest any mechanism by which an air gap between the windings 46 and the magnets 48 may be adjusted much less a track as recited in claims 14-21. The features required by claims 22-29 of a hood and an exhaust plenum are not disclosed or suggested by Appa.

U.S. Patent No. 6,492,743 B1 to Appa discloses counter-rotating rotors 36 and 40 which rotate about a horizontal rotation axis to generate an electrical output via a stationary armature and an inner rotating magnet drum. Appa does not disclose the feature of a

balancing mechanism as required by claims 1-13, the feature of an air gap adjustment mechanism as required by claims 14-21, or the features of a hood and an exhaust plenum as required by claims 22-29.

U.S. Patent No. 6,504,260 B1 to Debleser discloses first and second turbine rotors 10a and 10b mounted for rotation about a horizontal rotation axis, with the turbine rotors being mounted on a nacelle 3. Electric generators 9a and 9b rotate with the corresponding turbine rotor past a double stator fixed to the nacelle 3. Debleser does not disclose or suggest a balancing mechanism as required by claims 1-13, an air gap adjustment mechanism as required by claims 14-21 or a hood and exhaust plenum as required by claims 22-29.

U.S. Patent No. 6,655,907 B2 to Brock et al discloses a turbine impeller 12 disposed within a shroud 14 which causes a magnet 68 to rotate around a counter-rotating coil 70. Funnel sections 84, 86 direct air to the turbine impeller 12 while exhaust tube 66 directs exhaust air therefrom. No features of a balancing mechanism as recited in claims 1-13 or of an air gap adjustment mechanism as recited in claims 14-21 are disclosed or suggested by Brock et al. Brock et al also does not teach or suggest a hood, an exhaust plenum and a blade assembly all being rotatable about a vertical rotation axis and having the features recited in claims 22-29.

U.S. Patent Application Publication No. U.S. 2003/0137149 A1 to Northrup et al discloses a blade assembly 20 mounted for rotation about a horizontal rotation axis within a winged collector assembly 25 and carrying a rotor 30 for rotation past stator segments 40. Northrup et al does not disclose or suggest a balancing mechanism for balancing the torques produced by counter-rotating wind turbines and does not even relate to counter-

rotating wind turbines. No disclosure is provided by Northrup et al of a mechanism by which an air gap between the rotor 30 and the magnets 41 may be adjusted, much less a track as recited in claims 14-21. The wind collector 25 disclosed by Northrup et al does not correspond to the hood and exhaust plenum recited in claims 22-29, it being noted that the blade assembly 20 and the wind collector 25 are not both rotatable about a vertical rotation axis. In addition, the wind collector 25 does not have an air intake opening facing lateral to the rotation axis of the blade assembly 10, and does not have an outlet opening facing away from the rotation axis for blade assembly 20. Accordingly, the features required by claims 22-29 are not disclosed or suggested by Northrup et al.

German patent DE 3244719 A1 discloses a blade assembly carrying magnets for rotation past a stator. The blade assembly is mounted for rotation about a horizontal rotation axis (Fig. 7). No teachings or suggestions whatsoever are provided of a balancing mechanism as required by claims 1-13, of an air gap adjustment mechanism as required by claims 14-21, or of a hood and exhaust plenum as required by claims 22-29.

In light of the above, early and favorable consideration and action on the merits of the subject application is respectfully requested.

Respectfully submitted,

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